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FOUR SCIENCE EXPERIMENTS CHOSEN FOR SHUTTLE FACILITY

Four scientific experiments have been tentatively selected for NASA's Long Duration Exposure Facility (LDEF), scheduled as a major Space Shuttle payload in 1980.

The experiments will study the hazards to man of ion particles in space, the chemistry of micrometeoroids, the interstellar wind and cosmic ray nuclei.

These experiments join 23 technology experiments chosen for LDEF earlier this year (NASA Release No: 78-1, mailed Jan. 9, 1978).

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LDEF is an unmanned, reusable, free-flying facility on which many different technical and scientific experiments can be mounted in special trays. LDEF provides an easy and economical way to conduct primarily passive experiments in Earth orbit. It is managed by NASA's Langley Research Center, Hampton, Va.

Principal investigators for the scientific experiments represent three European universities, the European Space Agency and NASA's Johnson Space Center, Houston, Texas.

The new experiments were chosen from 55 proposed experiments related to scientific disciplines, including astrophysics, life sciences, lunar and planetary studies, solar terrestrial studies and upper atmospheric physics. A total of 190 candidate experiments were submitted to NASA in response to an announcement-of-opportunity distributed in June 1976.

With selection of the science experiments, 80 per cent of LDEF's experiment trays are now filled with individual research projects. The other 20 per cent will contain micrometeoroid detection panels, designed to measure the number and variety of tiny meteoroid particles in Earth orbit.

Nestled inside the Shuttle Orbiter's cargo bay during launch from NASA's Kennedy Space Center in Florida, LDEF will be placed in a circular Earth orbit of 435 kilometers (270 miles) with an inclination to the equator of 28.5 degrees.

LDEF will remain in orbit from six to nine months while its experiments are exposed to the space environment. At the end of the mission, LDEF will be retrieved by the Orbiter and returned to Earth. Experiments will be returned to their investigators for analysis.

Selected experiments and their principal investigators are:

- Free Flyer Biostack Experiment -- Investigator: Dr. Horst Bucker, Universitat Frankfurt am Main, West Germany.

The experiment will investigate the biological effectiveness of the structured components of cosmic radiation during space flight, emphasizing the effects of individual, very heavy ions. Information will be used to quantitatively assess the hazards of heavy ion particles to man in space, and establish radiation protection guidelines for man and biological experiments in future space flights. A six-month LDEF mission will yield about 360 per cent more total dose data than a typical Apollo mission.

- Interstellar Gas Experiment -- Investigators: Dr. Don L. Lind, NASA Johnson Space Center, Houston, Texas, and Dr. Johannes Geiss, University of Bern, Switzerland.

The experiment will analyze the interstellar noble gas atoms that penetrate the heliosphere to the vicinity of Earth. The structure of the interstellar gas flux varies considerably at different points in Earth's orbit. By collecting particles at several locations, the experiment will achieve the first on-site detection of interstellar gas, and will study the dynamics of the interstellar wind as it flows through the heliosphere and interacts with the solar photon flux and the solar wind.

Because the dynamics of the interstellar wind depend on its density and velocity before entering the heliosphere, the experiment will investigate these characteristics of the interstellar medium outside the region of the solar system.

- High Resolution Study of Ultra-Heavy Cosmic Ray Nuclei -- Investigators: D. V. Domingo and Dr. K.P. Wenzel, European Space Agency, The Netherlands; Prof. C.O. Ceallaigh, Dr. D. O'Sullivan and Dr. A. Thompson, Dublin Institute for Advanced Studies, Ireland.

The experiment will study charge and energy spectra of cosmic ray nuclei, and will search for super-heavy nuclei and heavy anti-nuclei. Information will help explain the physical processes of ultra-heavy nuclei production and acceleration at their source in interstellar space. Information on nucleosynthesis will also be obtained.

- Chemistry of Micrometeoroids -- Investigator: Dr. Fred Horz, NASA Johnson Space Center, Houston, Texas.

The experiment is designed to obtain chemical analysis of a statistically signficant number of micrometeoroids, and information about micrometeoroid density, shape and mass flux. If present hypotheses are correct, that most micrometeoroids are derived from comets, their chemical characterization becomes of great significance. Comets are generally considered to be relatively unaltered objects that reflect some arrested condition of early solar system condensation. Cometary solids appear to be rather primitive materials and, therefore, may offer rare insight into the formation of comets and the early solar system.

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